Panasonic
INDUSTRY

NEW

Servo System
MINAS A7 Family

MINAS A7

Industry-leading motion performance* for quick and intuitive adaptation to demanding situations

*As of September 2023, according to in-house research.

2023.9

This product is for industrial machines. It cannot be used in general households.

Agile Adaptability

Increase the productivity of machine, people and applications by adapting quickly and intuitively to demanding situations.

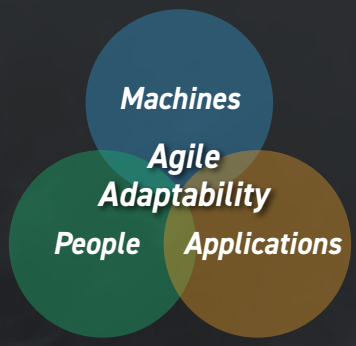
Basic servo performance that further enhances machine performance

The MINAS A7 achieves the industry's highest motion performance*, follows commands faithfully and provides strong resistance against disturbances.
Increased responsiveness to machines enables higher speed and higher precision.

*As of September 2023, according to in-house research.

Optimization of man-machine operations through servo intelligence

Making the servo intelligent simplifies setup, which used to take long hours of development, through auto-tuning functions, maintenance functions, and application optimization.
Increase the productivity of machines, people and applications by allowing them to adapt quickly and intuitively to more demanding situations.



MINAS A7

Agile Adaptability to Machines

Immediate response to commands and disturbances

Industry-leading* basic motion performance is faithful to commands and has strong resistance to disturbances. *As of September 2023, according to in-house research.

Encoder resolution **27 bit**, Speed response frequency **4.0kHz or more**, Max. motor rotational speed **7150r/min** *

*For MHMG022

Agile Adaptability to People

Immediate response at start-up and when trouble occurs

Expanded auto tuning, from easy start-up to automation of high level tuning.
Quick response with drive recorder function when trouble occurs.

Ultra-high precision **precAlse TUNING** High precision **One Minute TUNING** Easy **Drive recorder** Under development

Agile Adaptability to Applications

Immediate adaptation to specific applications

Application-specific functions are achieved without a controller.
Sensor direct input system contributes to highly responsive control.

Displacement control (Auto-focus control, meandering control)

Pressure control Under development

High-precision gantry control Under development

MINAS A7 Line-up

Servo system supporting various system configurations

SERVO DRIVER

Rotation type

EtherCAT®

Open network
EtherCAT-compatible
servo driver

MINAS A7B

- Standard type **A7BE**
- Multi-function type **A7BF**
- Application specialized type **A7BR**

RTEX Realtime Express

High-speed
Realtime Express-compatible
network servo driver

MINAS A7N

- Standard type **A7NE**
- Multi-function type **A7NF**
- Application specialized type **A7NR**

SERVO MOTOR

High inertia

MHMG

200 W, 400 W

*50 W to 100 W (□40), 750 W (□80) to 5.0 kW (□180) Under development

EtherCAT/RTEX Master

EtherCAT® RTEX Realtime Express

Motion Controller

GM1

PLC programming standardization

- Conforms to IEC61131-3, PLCopen, LD/ST/FBD/SFC/IL/CFC

Integration of PLC and motor

- Fastest cycle 500 µs, multi-task control

Expansive communication interface

- RTEX, EtherCAT
- OPC UA server, FTP server
- Ethernet/IP, Modbus, CodesysV3 communication

Analog/pulse train Modbus communication

Under development

MINAS A7S

- Standard type **A7SE**
- Multi-function type **A7SF**
- Application specialized type **A7SR**

Linear/DD motor type

Under development

Special order product

EtherCAT®

- Standard type **A7BL**
- Multi-function type **A7BM**
- Application specialized type **A7BV**

RTEX Realtime Express

- Standard type **A7NL**
- Multi-function type **A7NM**
- Application specialized type **A7NV**

Analog/pulse train Modbus communication

- Standard type **A7SL**
- Multi-function type **A7SM**
- Application specialized type **A7SV**

Medium inertia

MDMG Under development

- 1.0 kW to 5.0 kW

Low-speed torque

Medium inertia

MGMG Under development

- 850 W to 4.4 kW

Low inertia

MSMG Under development

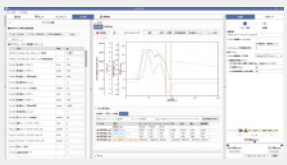
- 50 W to 5.0 kW

Support Tools

PANATERM

Servo motor set-up support software

With full featured tuning functions and more, servo motor set up support is available for everything from set up to test operation, operation status verification, maintenance and troubleshooting.



Servo motor selection software

This is a tool for selecting motor capacity by combining machine elements. Optional parts can also be selected.

Motor List

		50 W	100 W	200 W	400 W	750 W	850 W	1.0 kW
High inertia MHMG	100 V	40	40	60	60			
		3000 r/min (7150 r/min)			3000 r/min (6700 r/min)			
	200 V	40	40	60	60	80		80 3000 r/min (6700 r/min) 130 2000 r/min (3000 r/min)
		3000 r/min (7150 r/min)			3000 r/min (6700 r/min)	3000 r/min (6000 r/min)		
Medium inertia MDMG Under development	200 V							130
								2000 r/min (3000 r/min)
Medium inertia/Low-speed torque MGMG Under development	200 V						130	
Low inertia MSMG Under development	100 V	38	38	60	60			
		3000 r/min (7150 r/min)			3000 r/min (6700 r/min)			
	200 V	38	38	60	60	80		80 100
		3000 r/min (7150 r/min)			3000 r/min (6700 r/min)	3000 r/min (6000 r/min)		3000 r/min (6700 r/min)

Driver List

Open network EtherCAT-compatible servo driver

EtherCAT

		Rotation type			Linear/DD motor type (Under development / Special order product)		
		Standard type A7BE Series	Multi-function type A7BF Series	Application specialized type A7BR Series	Standard type A7BL Series	Multi-function type A7BM Series	Application specialized type A7BV Series
Control method	Position/Velocity/Torque control	●	●	●	●	●	●
	Full-closed control		●	●			
Interface	External scale		●	●		●	●
	Safety connector		●	●		●	●
	Sensor feedback			●			●

High-speed communication Realtime Express-compatible network servo driver

RTEX Realtime Express

		Rotation type			Linear/DD motor type (Under development / Special order product)		
		Standard type A7NE Series	Multi-function type A7NF Series	Application specialized type A7NR Series	Standard type A7NL Series	Multi-function type A7NM Series	Application specialized type A7NV Series
Control method	Position/Velocity/Torque control	●	●	●	●	●	●
	Full-closed control		●	●			
Interface	External scale		●	●		●	●
	Safety connector		●	●		●	●
	Sensor feedback			●			●

	1.3 kW	1.5 kW	1.8 kW	2.0 kW	2.4 kW	2.9 kW	3.0 kW	4.0 kW	4.4 kW	5.0 kW
		130		180			180	180		180
		2000 r/min (3000 r/min)								
		130		130			130	180		180
		2000 r/min (3000 r/min)								
	130		130		180	180			180	
	1500 r/min (3000 r/min)									
		100		100			120	130		130
		3000 r/min (5000 r/min)								

(How to read the table) 130 — Flange angle; 3000 r/min (6700 r/min) — Rated rotation speed (maximum rotation speed); 60 — Under development

Analog/pulse train Modbus communication

		Rotation type (Under development)			Linear/DD motor type (Under development / Special order product)		
		Standard type A7SE Series	Multi-function type A7SF Series	Application specialized type A7SR Series	Standard type A7SL Series	Multi-function type A7SM Series	Application specialized type A7SV Series
Control method	Position control	●	●	●	●	●	●
	Block operation	External contact only	External contact or Modbus communication	External contact or Modbus communication	External contact only	External contact or Modbus communication	External contact or Modbus communication
	Velocity control		●	●		●	●
	Internal velocity command	External contact only	External contact or Modbus communication	External contact or Modbus communication	External contact only	External contact or Modbus communication	External contact or Modbus communication
	Torque control		●	●		●	●
	Full-closed control		●	●			
	Block control		External contact or Modbus communication	External contact or Modbus communication		External contact or Modbus communication	External contact or Modbus communication
Interface	Pulse	●	●	●	●	●	●
	Analog		●	●		●	●
	Modbus		●	●		●	●
	External scale		●	●		●	●
	RS-232, RS-485		●	●		●	●
	Safety connector		●	●		●	●
	Sensor feedback			●			●

Improved basic performance directly linked to equipment performance

Servo system boasting industry-leading motion performance*

*As of September 2023, according to in-house research.

Increasing gain by improving basic performance allows for immediate response to commands and disturbances

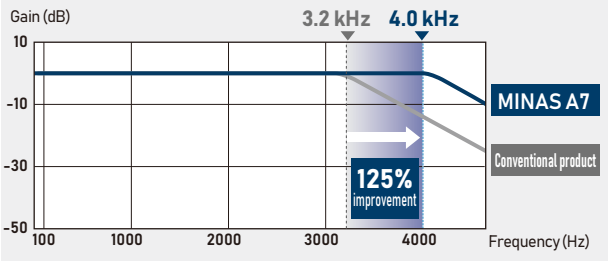
High precision Control performance that achieves smoother and more accurate operation

Improved machining quality through high response control

Speed response frequency

4.0 kHz or more ◀ 3.2 kHz (Conventional product) — Industry-leading*

Velocity response frequency has been increased to 125% compared to conventional models. As gain can be increased, an immediate response to both commands and disturbances is possible, improving machining quality.



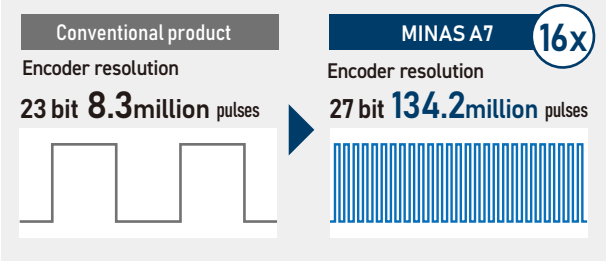
*As of September 2023, according to in-house research.

Improved positioning performance

Encoder resolution

27 bit ◀ 23 bit (Conventional product) — Industry-leading*

Thanks to the industry's highest* resolution, positioning performance is greatly improved with smooth movement to the target position and accurate stopping.

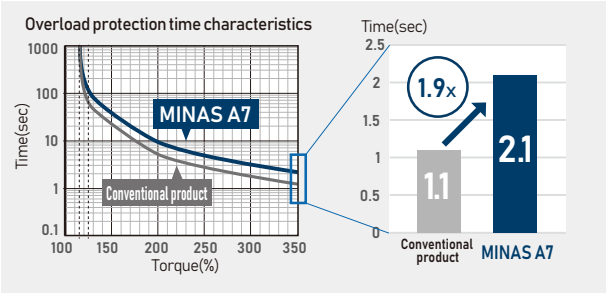


*As of September 2023, according to in-house research.

Stable operation Increased durability

Extending overload operation time

Reducing the heat generation of the motor extends operating time during overload by 1.9 times compared to conventional models. This contributes to the stable operation of equipment that operates for long periods of time in high-load areas, such as press machines and robots.



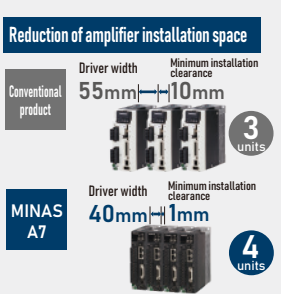
*Example of 350% load (while rotating) with a 200 W motor

Space saving More flexible installation

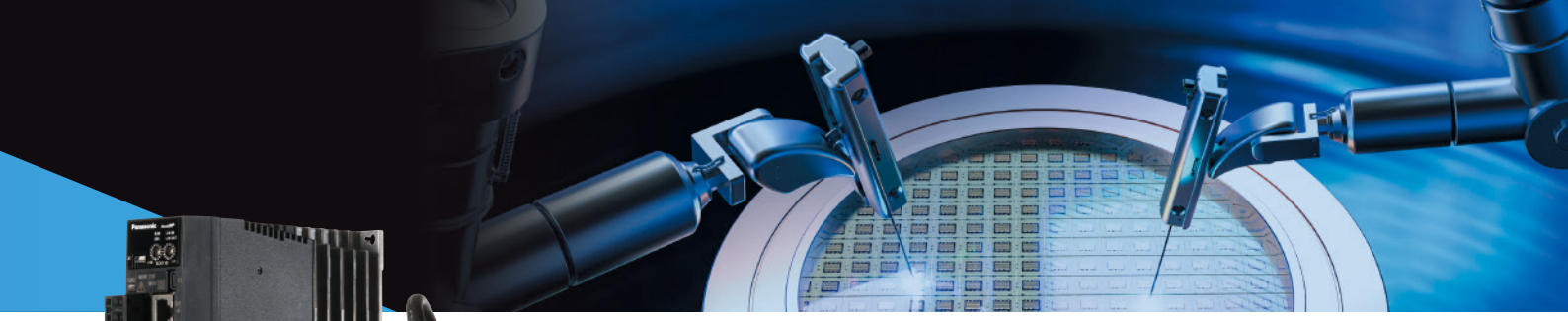
Further miniaturization and weight reduction

Both servo motors and amplifiers have been further miniaturized. The motors contribute to improved control performance by reducing the size, weight, and inertia of robots and equipment in which the motors are used.

Compared to 1 kW motor



Compared to 400W driver



High speed　Increased speed for a shorter takt time

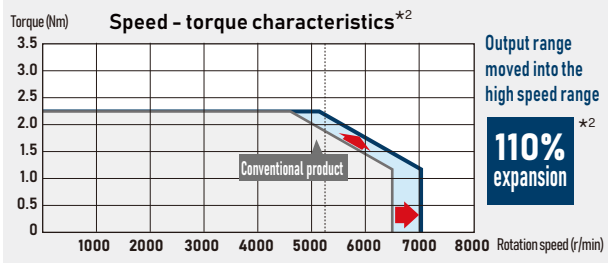
Increased output without changing the size of the motor

Max. motor rotational speed

(Conventional product) 6500 r/min

7150 *1 **r/min**

The MINAS A7 is smaller than conventional models, and the operation range has beenexpanded to 110%*2. By expanding output to the high speed range, equipment velocity has been improved without changing to a larger motor.



*1: For MHMG022
*2: Compared to 200 W motor

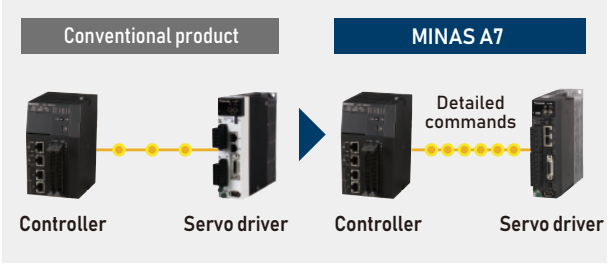
High precision with detailed command output

Minimum communication cycle

(Conventional product) EtherCAT 125 µs　RTEX 62.5 µs

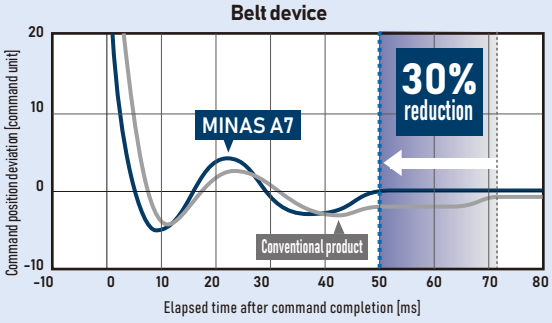
62.5 µs

The minimum communication cycle is 1/2 that of conventional models. It can respond to the control cycle of controllers that are becoming ever faster, allowing for more detailed control.

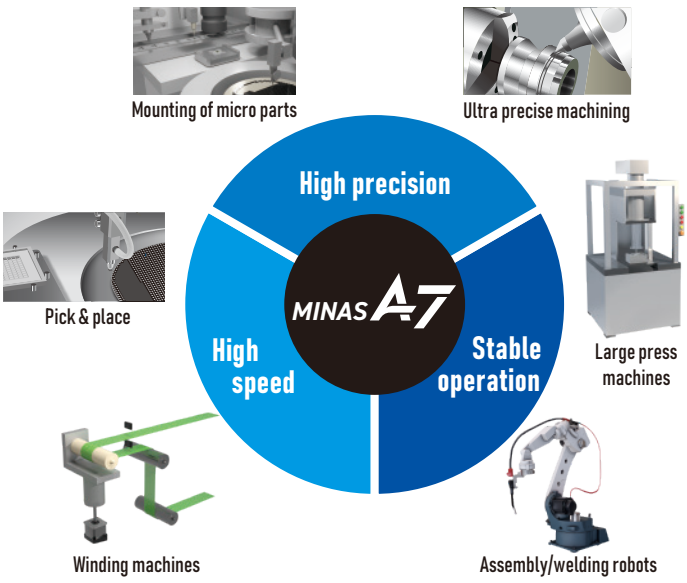


Stop precisely at the target position
Improved positioning setting time

In addition to improved motor and encoder performance and an evolution of our proprietary positioning algorithm, resonance and mechanical vibration are automatically removed for highly accurate positioning.



Contributing to improved equipment performance



From simple tuning to ultra-high precision tuning that require expert skill

Automatic tuning reduces startup engineering man-hours

Optimal man-machine coordination during tunig is achieved through servo intelligence

Immediate response even at start-up

Three tuning settings can be selected according to whether you wish to prioritize tuning time or control precision

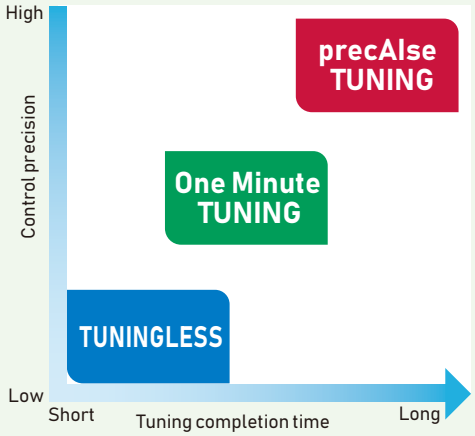
TUNE COMPASS

It is possible to select the optimal tuning method to match customer requests, from situations that require tuning difficult for even expert engineers to those that require immediate operation.

precAIse TUNING — Priority on control precision [Ultra-high precision] From half a day
Ultra-high precision automatic tuning that exceeds the abilities of experts

One Minute TUNING — Balance on accuracy and time [High precision] Approx. 1 min.
High precision automatic tuning according to equipment characteristics

TUNINGLESS — Priority on tuning time [Immediate operation] 0 sec.
Simple real-time automatic tuning according to equipment load



High precision — The driver understands equipment characteristics and implements tuning while taking control margins into consideration.

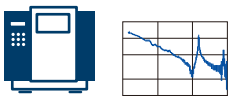
One Minute TUNING

Optimized to fit the equipment in a short time with a 3-step operation.
Adjustment margins for aging and individual differences can also be considered.

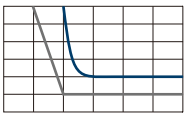
Automatic processing

Default settings ▶ STEP.1 Equipment characteristics measurement (Unique algorithm) ▶ STEP.2 Control parameter optimization (Unique algorithm) ▶ STEP.3 Response confirmation ▶ Tuning complete

≪Configuration items≫
・Purpose
・Operating range etc.
*Adjustable margin level



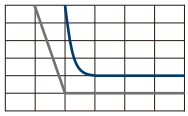
Automatic tuning of parameters taking control margins into consideration

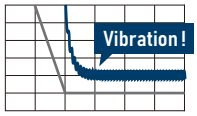


Approx. 1 min.

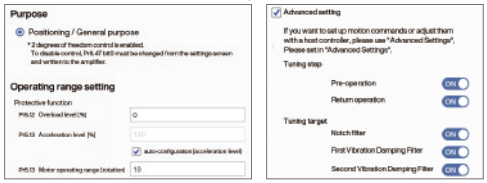
Automatic re-tuning of specific items with pinpoint accuracy in response to material and location changes

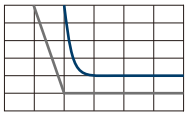
Already tuned ▶ Design change ▶ Automatic re-tuning of only specified items ▶ Tuning complete





Select and recalibrate only the functions that reduce vibration.





Immediate operation — Automatic tuning according to the equipment load during operation, to effortlessly achieve stable operation

TUNINGLESS

Every time the equipment is moved, the servo driver automatically carries out simple real-time tuning according to the equipment load.

~~Tuning work~~ ▶ Positioning operation ▶ Tuning when operation is completed

* TUNE COMPASS is a trademark of Panasonic Holdings Corporation.

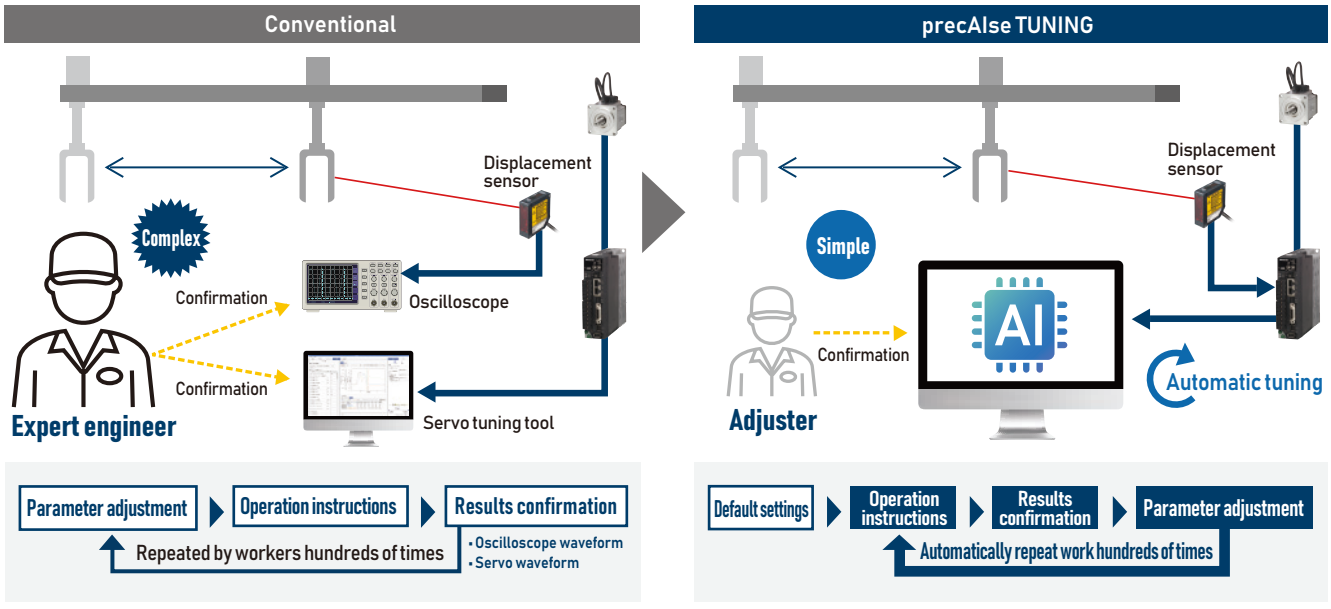
Ultra-high precision The AI uses expert judgment to easily achieve ultra-high precision tuning

precAIse TUNING

Complex tuning that take several days even for expert engineers are automatically optimized by AI just by setting the conditions, making μm level ultra-high precision tuning easily achievable.

[Applicable equipment] Equipment such as mounters, coating equipment and processing machines which require ultra-precise positioning accuracy

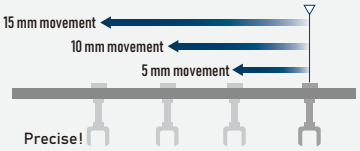
AI achieves high-precision tuning that exceeds the abilities of experts.



High level of automatic tuning satisfies performance requirements for all locations and operations

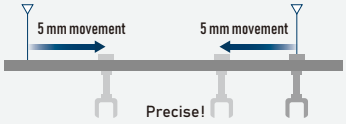
Multiple locations

Tuning that meet the required performance at all locations with a single parameter tuning



Multiple operations

Tuning that meet the required performance for all operations with a single parameter tuning



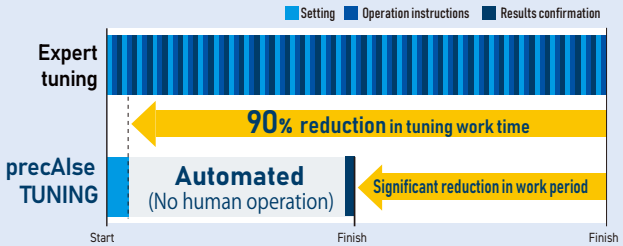
メリット①

Achieves positioning accuracy exceeding that of an expert

* Measured in our experimental environment. Measurement of the settling time required for the position deviation to settle within a specified settling range.

メリット②

Significant reduction in tuning work time and tuning period



* Measured in our experimental environment. Measured time required for tuning work to bring the position deviation within the specified settling range.

Increase productivity from start-up to maintenance

Monitoring/diagnostic function

Optimal man-machine coordination during maintenance work is achieved through servo intelligence

Immediate response even for maintenance work

When trouble occurs

Understand the cause and resolve

By recording data before and after trouble occurs, the cause can be analyzed and the issue quickly solved.

Drive recorder function

Before trouble occurs

Prevent trouble from occurring

Detects signs of abnormal equipment characteristics, notifying the user before an error occurs. The timing of mechanical adjustments and parts replacement can be understood before equipment stops due to an error.

Deterioration diagnosis function

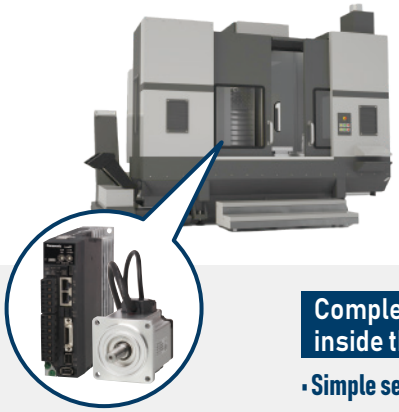
When trouble occurs

Record signal waveforms and error information before and after trouble occurs, on a single servo driver

Drive recorder function

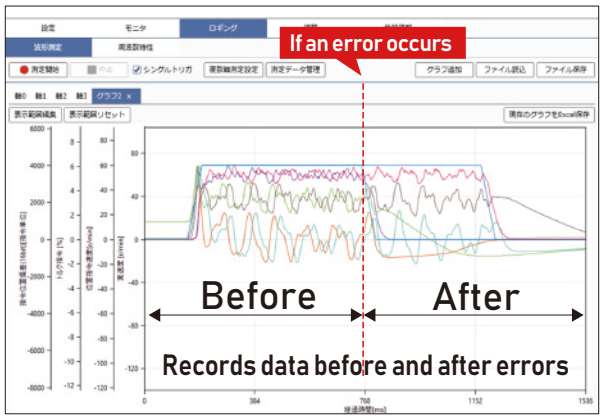
Under development*

Servo drivers are equipped with a logging function. Since data can be recorded and saved in the servo itself, it is possible to collect data in detailed cycles, allowing for a detailed analysis of what happened when an error occurs.



Servo driver with logging function

Up to 32 data sets can be saved



Complete functionality inside the servo

- Simple setup
- High-speed logging
- Transmission to a host system not required
- Data security ensured

Analysis is possible on multiple axes together with time series data

The time stamp function can be used to understand the details of alarm occurrence times for each axis, making it possible to identify the axis on which the alarm occurred first, the axis with the accompanying alarm, etc., allowing for an analysis of the root cause of the problem.

Before trouble occurs Monitor servo motor status in real time to predict and prevent trouble before it occurs

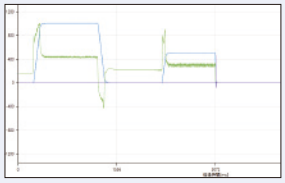
Deterioration diagnosis function

Under development*

Catch unusual equipment/motor characteristics during operation

Equipment in operation

Catch signs of changes to characteristics



Load characteristics estimation

Are there any changes in load characteristics?

Torque command diagnosis

Is there torque outside the expected range?

When signs are detected/ during periodic maintenance

Proactive maintenance of detected suspect areas

Mechanical adjustment/parts replacement for suspect areas **Immediate response**

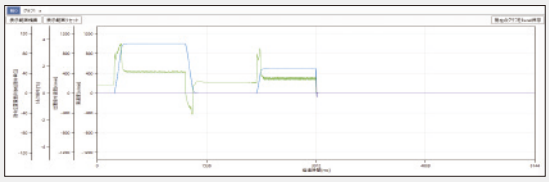
Abnormal noise risk estimation Under development

Is there any deterioration of the ball screw mechanism, etc., for the specified servo axis?

Load characteristics estimation

Continuously diagnoses changes in load characteristics to detect signs that a motor is not moving as smoothly as usual.

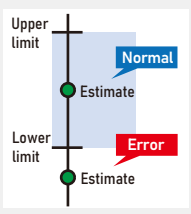
1 Monitor servo data in real time



2 Estimate the load characteristics

- Inertia ratio estimate
- Offset load estimate
- Dynamic friction estimate
- Viscous friction estimate

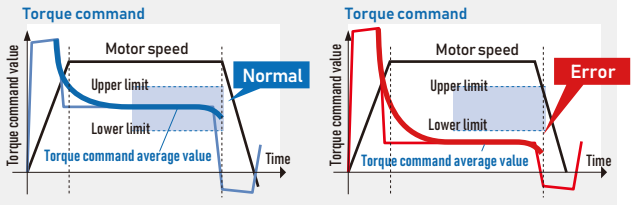
3 Warn if an estimate is out of the set range



Torque command diagnosis

Constantly diagnoses torque commands during operation at a constant speed to detect issues in drive parts and the motor itself before a malfunction occurs.

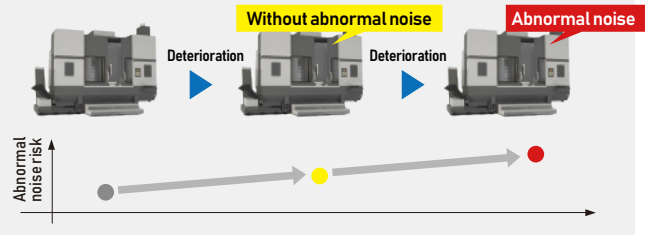
Real-time monitoring of torque command data at constant speed



Abnormal noise risk estimation

Under development

The risk of abnormal noise due to oscillation can be estimated and diagnosed before it occurs.



*Release schedule will vary depending on the series and capacity. Please contact us for details.

Specialized for applications

Simple installation with no need for a host controller program

Application specialized type

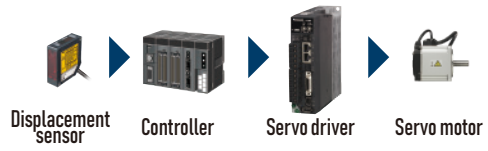
- Sensor direct feedback (Displacement control) — EtherCAT
- Sensor direct feedback (Pressure control) [Under development] — RTEX Realtime Express
- High-precision gantry control [Under development] — Analog, pulse train, Modbus

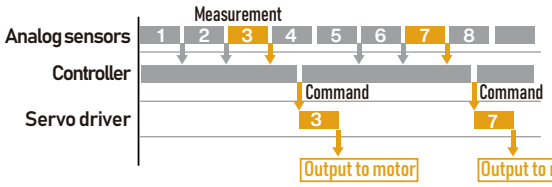
High responsiveness and smooth control not dependent on a controller

Sensor direct feedback

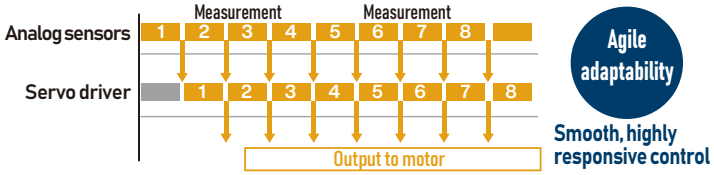
Analog data from sensors, etc., is directly input to the servo driver, allowing high-speed response control simply by setting up the servo driver. This makes it possible to eliminate complex host controller programs required in the past.

Conventional system

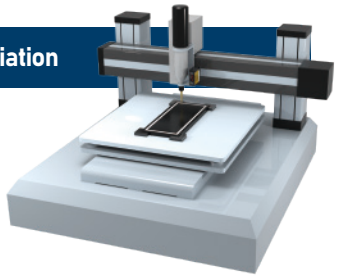




Sensor direct feedback



Sensor direct feedback — Accurate position correction according to workpiece variation

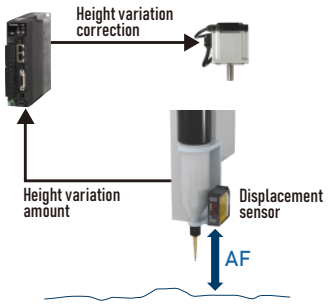


Displacement control (Auto-focus control, meandering control)

Full-closed control that is completed within the driver through direct input of the displacement sensor to the servo driver. The high-speed feedback control is not dependent on a host controller, providing a high-speed response to workpiece variations.

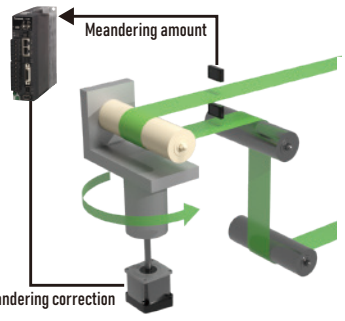
Auto-focus control

Achieves high-quality processing/coating with a constant clearance, even for workpieces with varying heights



Meandering control

No special unit is required for meandering correction, as high-precision meandering control is achieved with the servo



Example applications: Dispensers | Display bonding equipment | Scribing devices | Laser processing machines | Lithium-ion battery winding machines | Packing machines

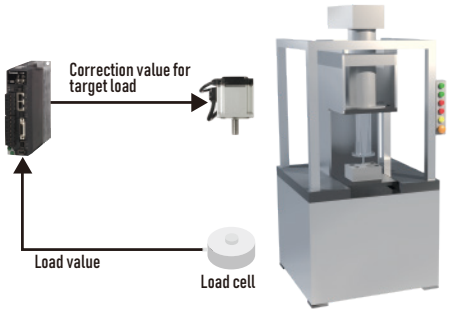
Sensor direct feedback

Simplifies complex control programs for stable, highly precise pressure control

Pressure control

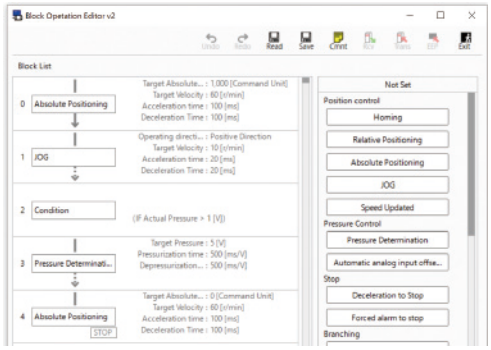
Under development*

High response and stable operation control is achieved through full-closed control that is completed within the driver by directly inputting the pressure sensor output signal to the servo driver.



The simple block operation editor allows for immediate configuration of motion patterns with intuitive operation. High response pressure control is achieved simply by selecting control mode switching.

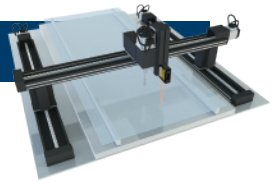
Block operation editor



Example applications: Press machines | Bonding equipment | Assembly equipment | Press fitting equipment | Capping devices | Screw tightening equipment

Gantry control model

Advanced coordination control, ease of use and safety functions ideal for gantry mechanisms



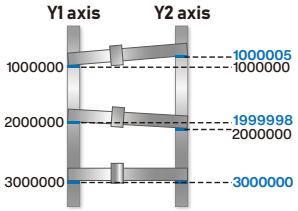
High-precision gantry control

Under development*

Precise Gantry torsion correction (table)

Measure positional deviation between two axes beforehand and save as a table to correct torsion and improve positioning accuracy.

Correct by creating and operating a position correction table in advance

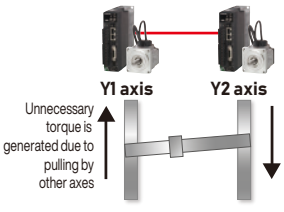


Y1 axis position	Y2 axis position while maintaining verticality	Y2 axis position correction amount
0	0	0
1000000	1000005	5
2000000	1999998	-2
3000000	300000	0

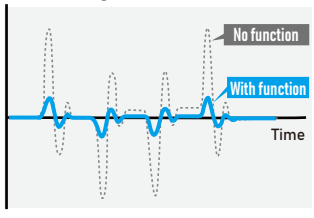
Faster Gantry torsion correction (real-time)

Torque interference is reduced by detecting and correcting torsion between axes in real time, enabling high speed operation.

Coordinated communication between axes



Torsion (misalignment of two axes)



Simpler Gain tuning optimization

Gantry mechanism tuning, which used to require complex tuning, is now quicker and easier.

Safer Coordinated stoppage during an alarm

When an alarm occurs on one axis, the two axes are stopped in a coordinated manner to prevent mechanical damage.

Example applications: Bonding equipment | Substrate inspection equipment | Scribing devices | Grinding equipment | Mounters | Laser processing machines

*Response time will vary depending on the series and capacity. Please contact us for details.

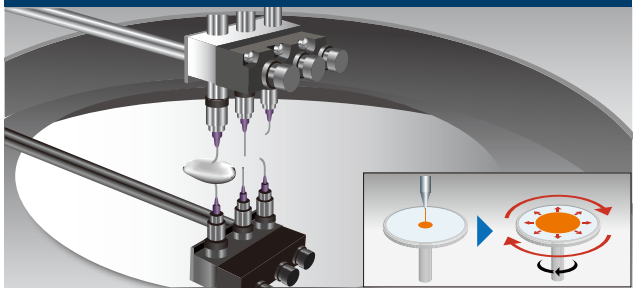
Meeting the need for further miniaturization and increased processing accuracy

Contributing to improved equipment performance

Semiconductor manufacturing process

In response to the demand for miniaturization and multi-layering of semiconductor chips, higher speed and higher precision control is required in each manufacturing process.

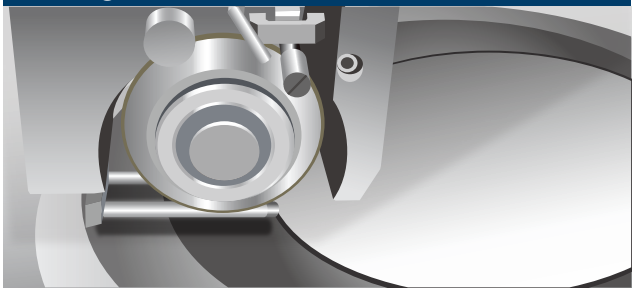
Spin coaters



Chemical solutions are evenly spread by rotating the wafer. The high-speed rotation contributes to increased thinness.

Max. motor rotational speed 7150 r/min

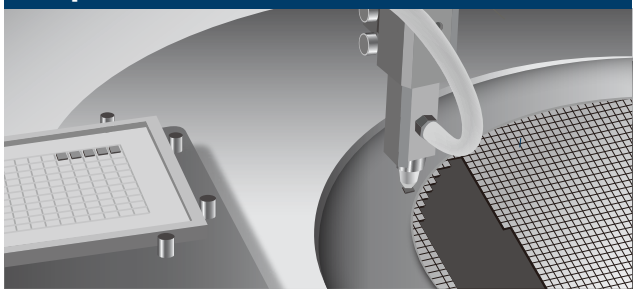
Dicing saws



By improving positioning accuracy, micro IC chips can be formed from wafers.

Improved positioning accuracy

Chip transfer machines



Suppresses minute tip vibrations and realizes high-speed pick & place of microscopic IC chips.

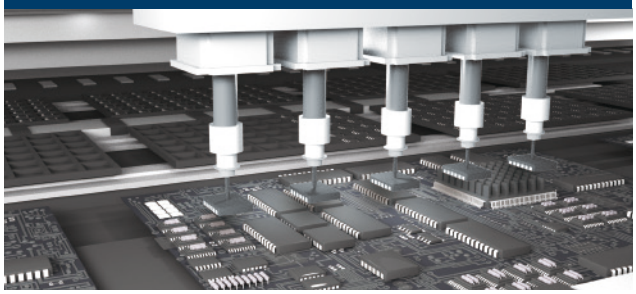
precAIs TUNING

Bonding equipment

High-response load control prevents mounting failures and damage to microchips during substrate mounting.

Sensor direct feedback (Pressure control)

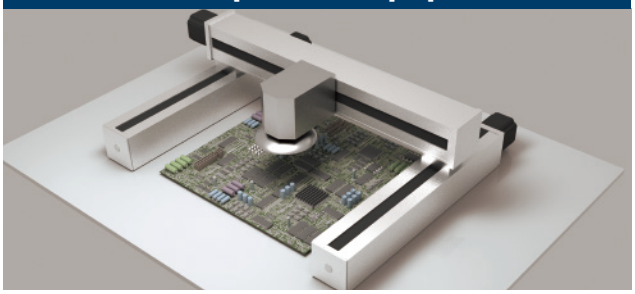
IC handlers



Abnormal stops due to overloading are reduced, even when quick acceleration/deceleration is repeated under high load conditions.

Extending overload operation time

Substrate inspection equipment



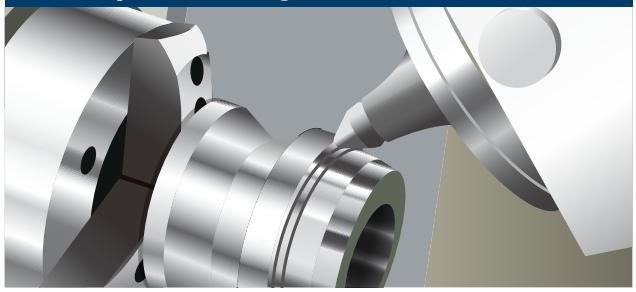
The dual axes of the gantry mechanism allow for smooth, high-speed operation, enabling high-speed inspection.

High-precision gantry control

Processing machinery

As products become denser and more sophisticated, higher precision control is required for all machines, even those that process the individual parts making up the product.

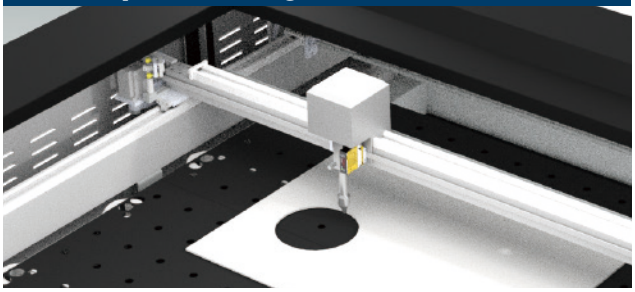
Metal processing machines



Improved basic performance can increase the gain, enabling ultra-precise, nanometer-order machining.

Encoder resolution 27 bit **Velocity response frequency 4.0 kHz or more**

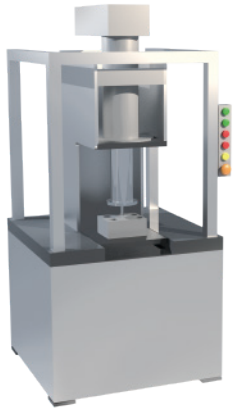
Laser processing machines



High-quality machining is achieved by correcting unevenness with regard to height with a high level of responsiveness.

Sensor direct connection auto-focus control

Press machines



Operation patterns for high-response pressure control can easily be constructed without a host program.

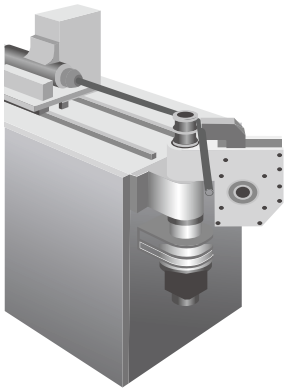
Block operation function

Injection molding machines

High-response pressure control stabilizes filling pressure and suppresses filling defects and burrs.

Sensor direct feedback (Pressure control)

Pipe bending machines



Both position control and pressure control are fully closed within the servo system, achieving high speed and accurate bending.

Sensor direct feedback (Pressure control)

Servo system MINAS A6 Family

An extensive lineup of high-speed, high-torque, compact and lightweight servo system

MINAS A6 Family

Encoder resolution	23 bit
Encoder	Absolute, Incremental, Battery-less absolute
Velocity response frequency	3.2 kHz
Motor capacity	50 W to 22 kW

Servo driver

[Rotation type]

Analog/Pulse train input/ Modbus communication

MINAS A6S

Position control type	A6SE
General-purpose communication type (Special order)	A6SG
Multifunction type	A6SF

RTEX Realtime Express

High speed communication For Realtime Express Network servo driver

MINAS A6N

Position control type	A6NE
Multifunction type	A6NF

EtherCAT® Special order

Open network EtherCAT communication servo driver

MINAS A6B

Position control type	A6BE
Multifunction type	A6BF
Application-optimized type (Special order)	
・Displacement control	A6BU
・Gantry control*	A6BN

*: Linear motors supported

[Linear and DD motor types]

Special order

MINAS A6L

Pulse train/Modbus
RTEX-compatible
EtherCAT-compatible

[DC 24 V /DC 48 V]

Special order

MINAS A6 Frame V

Pulse train/Modbus
RTEX-compatible
EtherCAT-compatible

[Dual-axis servo driver]

Special order

Servo motor

Low inertia

MSMF

100 V 50 W to 400 W
200 V 50 W to 5.0 kW

Medium inertia Flat type

MQMF

100 V 100 W to 400 W
200 V 100 W to 400 W

Medium inertia

MDMF

200 V 1.0 kW to 22.0 kW

Medium inertia Low-speed, high torque

MGMF

200 V 850 W to 5.5 kW

High inertia

MHMF

100 V 50 W to 400 W
200 V 50 W to 7.5 kW

G A lineup of geared motors is also available

*We offer a connector type and a lead wire type.

Sustainability

Panasonic Industry practices sustainable management, contributing to the future of the earth and the development of society

Panasonic GREEN IMPACT

The Panasonic Group has established “Panasonic GREEN IMPACT”, a long-term environmental vision aimed at achieving better living and a sustainable global environment.Through this vision we aim to reduce CO_2 emissions associated with our business to virtually zero by 2030, and by 2050, we aim to create a reduce contributions by* 300 million tons, or roughly 1% of current global emissions (approx. 33 billion tons).

*Energy-related CO_2 emissions in 2019: 33.6 billion tons (source: IEA). 300 million tons calculated using 2020 emission factors

Reducing our environmental impact

▪ Compact and lightweight

Achieves a 15% reduction compared to previous models

The MINAS A7 Family of AC servo motors, used in industrial machinery and industrial robots, have achieved industry-leading high speeds and large torques while reducing weight by 15% (500 g) compared to our conventional models.

▪ Paperless instruction manuals

Starting with the MINAS A7 Family, included instruction manuals have been made paperless to reduce the environmental impact.

▪ Reducing the environmental impact of packaging materials

We have reviewed packaging materials from the ground up, and are switching to paper materials with a low environmental impact.

▪ Front panel model nameplate changed to laser printing

This conserves model nameplate stamps, taking the environmental impact into consideration.

*Compared with 1.0 kW motors

Chemical substance-based initiatives

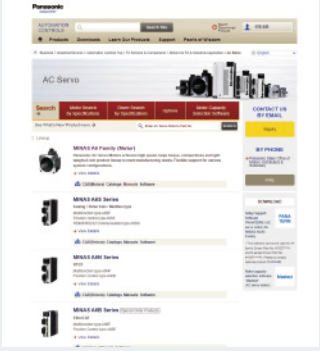
▪ Lead-free and RoHS-compliant

All solder used at our manufacturing sites is free of lead and conforms to the regulations preventing the inclusion of the six substances in the EU RoHS directive 2011/65/EU and the four substances in the EU RoHS directive 2015/863/EU. We have also confirmed that there is no intentional use exceeding the threshold for said substances.

(Responding to overseas environmental regulations)

- RoHS (China)
- Toxic Substances Control Act (TSCA, United States)
- K-Reach (South Korea)
- RoHS (Europe)

Website Information



Panasonic Industry Automation Controls website

URL industrial.panasonic.com/ac/

We provide extensive technical information that ranges from motor selection to materials useful for design.

Product information **What's new**
- New product information
- Motor news
- Software version upgrade information

Design **Download**
- Manuals
- Technical documents
- Standard specifications
- CAD
- Software

Selection **Servo motor selection software** (Online tool)

Automatically selects items ranging from machine elements and operation patterns, to motors, drivers and optional products!

⚠ Safety Precautions

- Important Notes on exporting this product or equipment containing this product;
  If the end-user or application of this product is related to military affairs or weapons, its export may be controlled by"Foreign Exchange and Foreign Trade Control Law" of Japan where export license will be required before product can be exported from Japan.
- This product is designed and manufactured for use in General Purpose Industrial Equipment and it is not intended to be used in equipment or system that may cause personal injury or death.
- All servicing such as installation, wiring, operation, maintenance and etc., should be performed by qualified personnel only.
- Tighten mounting screws with an adequate torque by taking into consideration strength of the screws and the characteristics of material to which the product will be mounted. Over tightening can damage the screw and/or material; under tightening can result in loosening.
- Install safety equipment to prevent serious accidents or loss that is expected in case of failure of this product.
- Consult us before using this product under such special conditions and environments as nuclear energy control, aerospace, transportation, medical equipment, various safety equipments or equipments which require a lesser air contamination.
- We have been making the best effort to ensure the highest quality of our products, however, some applications with exceptionally large external noise disturbance and static electricity, or failure in input power, wiring and components may result in unexpected action. It is highly recommended that you make a fail-safe design and secure the safety in the operative range.
- If the motor shaft is not electrically grounded, it may cause an electrolytic corrosion to the bearing, depending on the condition of the machine and its mounting environment, and may result in the bearing noise. Checking and verification by customer is required.
- Failure of this product depending on its content may generate smoke of about one cigarette. Take this into consideration when the application of the machine is clean room related.
- Please be careful when using the product in an environment with high concentrations of sulfur or sulfuric gases, as sulfuration can lead to disconnection from the chip resistor or a poor contact connection.
- Do not input a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may lead to damage of the internal parts, causing smoke and/ or fire and other troubles.
- The user is responsible for matching between machine and components in terms of configuration, dimensions, life expectancy, characteristics, when installing the machine or changing specification of the machine. The user is also responsible for complying with applicable laws and regulations.
- Manufacturer's warranty will be invalid if the product has been used outside its stated specifications.
- Component parts are subject to minor change to improve performance.
- Read and observe the instruction manual to ensure correct use of the product.

Repair	Consult to the dealer from whom you have purchased this product for details of repair work. When the product is incorporated to the machine you have purchased, consult to the machine manufacturer or its dealer.
URL	Electronic data of this product (Instruction Manual, CAD data) can be downloaded from the following web site; industrial. panason ic.com/ac/e/

● Contact to : _____

Panasonic
INDUSTRY

Panasonic Industry Co., Ltd.,
Industrial Device Business Division
1-1 Morofuku 7-chome, Daito, Osaka, 574-0044, Japan

Panasonic Industrial Search

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